

Mark Scheme

Sample Assessment Material

GCSE

GCSE in Mathematics Specification B
Higher Tier

Unit 1: Statistics and Probability (Calculator)

General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.
- Mark schemes will indicate within the table where, and which strands of QWC, are being assessed. The strands are as follows:

i) ensure that text is legible and that spelling, punctuation and grammar are accurate so that meaning is clear

Comprehension and meaning is clear by using correct notation and labelling conventions.

ii) select and use a form and style of writing appropriate to purpose and to complex subject matter

Reasoning, explanation or argument is correct and appropriately structured to convey mathematical reasoning.

iii) organise information clearly and coherently, using specialist vocabulary when appropriate.

The mathematical methods and processes used are coherently and clearly organised and the appropriate mathematical vocabulary used.

Guidance on the use of codes within this mark scheme
M1 - method mark
A1 - accuracy mark
B1 - working mark
C1 - communication mark
QWC - quality of written communication
oe - or equivalent
cao - correct answer only
ft - follow through
sc - special case

Unit 1 Higher Tier: Statistics and Probability

5MB1H				
Question	Working	Answer	Mark	Additional Guidance
1.				
(a)		$30 \leq a < 40$	1	B1 cao
(b)		Points plotted at (25, 16), (35, 20), (45, 23), (55, 9), (65, 2) and joined with line segments	2	B2 complete polygon (ignore histograms and any lines below an age of 25 or above an age of 65), but award B1 only if there is a line joining the first to the last point (B1 one vertical or horizontal plotting error or incorrect but consistent error in placing the midpoints horizontally or correct plotting but not joined) Plotting tolerance: 1 (2 mm) square; points to be joined by lines (ruled or hand drawn, but not curves)
Total for Question: 3 marks				
2.				
QWC	$2(215) + 3(128) = 814$ $2(211) + 3(134) = 824$ $2(223) + 3(119) = 803$	Easy Plane £803	6	M1 for $2 \times \text{Adult} + 3 \times \text{Child}$ M1 for using correct Adult and Child, i.e. (215, 128) or (211, 134) or (223, 119) A2 for 814, 824 and 803 (A1 for one or two correct or for a correct $2 \times \text{'Adult'} + 3 \times \text{'Child'}$) B1 for correct units, i.e. £ or pounds C1 for Easy Plane identified QWC: Decision must be stated and total costs must be attributable
(i, ii, iii)				
FE				
Total for Question: 6 marks				

5MB1H				
Question	Working	Answer	Mark	Additional Guidance
3. QWC (i, iii)	Median (boys) = 45 Median (girls) = 50 Range (boys) = $65 - 22 = 43$ Range (girls) = $66 - 27 = 39$ IQR (boys) = $57 - 39 = 18$ IQR (girls) = $57 - 38 = 19$	Compares 1. medians 2. range/IQR	6	B2 for median (boys) = 45 and median (girls) = 50 (B1 for one correct median) B2 for range (boys) = 43 and range (girls) = 39 OR IQR (boys) = 18 and IQR (girls) = 19 (B1 for one correct range/IQR) OR B2 for fully correct diagram/chart to compare, e.g. box plots, cumulative frequency diagrams, etc (B1 for diagram/chart with one error in presentation) C1 for median (girls) > median (boys) oe or ft their medians or for range (boys) > range (girls) oe or ft their ranges or IQR (girls) > IQR (boys) oe or ft their IQRs C1 for comments relating to all working (ie range/median/charts dep on B4) QWC: Decisions should be justified, and calculations attributable SC If no marks scored B1 for a correct comparison
Total for Question: 6 marks				
4. (a)		Question + response boxes	2	B2 for a suitable question with at least 3 non-overlapping response boxes (must include a time period) (B1 for a suitable question with time period or non-overlapping response boxes)
(b)		Reason	1	B1 for biased or all the students the same age or students (may) eat more sweets, etc
Total for Question: 3 marks				

5MB1H					Additional Guidance	
Question	Working	Answer	Mark			
5.						
(a)(i)		Line of best fit	5			B1 for line drawn between (190, 80), (190, 95) and (210, 105), (210, 120)
(ii)		1.25				M1 for diff. $y / \text{diff. } x$ A1 for $0.5 - 2$ or ft their line of best fit
(iii)		practical interpretation				B2 for increase in kg per cm increase in height oe (B1 for a correct interpretation with only one or no units)
(b)		40%	2			M1 for a horizontal line at 99 and a vertical line at 200 or for 2 seen A1 for 40% or $\frac{2}{5}$ or 0.4 oe
					Total for Question: 7 marks	
6.						
FE	Score 30g:10g:5g $200 \div 5 = 40$ $500 \div 10 = 50$ $2000 \div 30 = 66.7$	40	4			M1 for $45 \div (6 + 2 + 1)$ A1 for SRF = 30, B = 10, C = 5 M1 for $200 \div 5$ or $500 \div 10$ or $2000 \div 30$ A1 cao OR M1 for 6×200 or 2×200 or 1×200 or 6×500 or 2×500 or 1×500 or 6×2000 or 2×2000 or 1×2000 A1 for SRF, B, C = 1200, 400, 200 or 1500, 500, 250 or 2000, 666.7, 33.3 M1 for $(1200 + 400 + 200) / 45$ A1 cao
					Total for Question: 4 marks	
7.						
(a)	$1 - (0.15 + 0.1) = 0.75$	0.25	2			M1 for $1 - (0.15 + 0.1)$ or 0.75 seen A1 cao
(b)		appropriate correct explanation	1			C1 for an appropriate correct explanation, e.g. you can't have 4.5 green counters or 9÷5 is not a whole number, or that would mean there are 1.8 yellow counters
					Total for Question: 3 marks	

5MB1H				
Question	Working	Answer	Mark	Additional Guidance
8.	$(120 \times 231 - 20 \times 236) \div 100$	230	3	M1 for 120×231 or 20×236 or 27720 or 4720 seen M1 for $(120 \times 231 - 20 \times 236) \div 100$ oe A1 cao
Total for Question: 3 marks				
9. QWC (ii, iii) FE	$3.02/100 \times 20000 \times 3$ $20000 \times (1.0298)^3$	(£)1812 (£)1841.81 Investment B	6	M1 for a complete process, e.g. $3.02/100 \times 20000 \times 3$ or $1.0302 \times 20000 \times 3$ A1 for 1812 or 21812 M2 for a complete process, e.g. $(1.0298)^3 \times 20000$ (M1 for 1.0298×20000 oe or 20596 seen) A1 for 1841.81 or 21841.81 seen C1 for selecting the greater of '1812' and '1841.81' or '21812' and '21841.81' QWC: Decision must be stated with all calculations attributable
Total for Question: 6 marks				
10.	$0 \leq d < 10$ fd 0.5 $10 \leq d < 20$ fd 1.8 $20 \leq d < 25$ fd 3.0 $25 \leq d < 40$ fd 0.8 $40 \leq d < 60$ fd 0.5	Correct histogram	3	B2 for 5 correct histogram bars $\pm \frac{1}{2}$ square (B1 for 3 histogram bars correct) B1 for frequency density label or key and consistent scaling
Total for Question: 3 marks				
11.	(a) (i) (ii)	Correct explanation	1 1	C1 for all have equal chance of being selected C1 for groups in the sample are in the same proportion as they are in the population
	(b) $\frac{184}{850} \times 50$	11	2	M1 for $\frac{184}{850} \times 50$ or $\frac{184}{17}$ A1 cao
Total for Question: 4 marks				

5MB1H				
Question	Working	Answer	Mark	Additional Guidance
12.	$0.5 \times 5 + 0.25 \times 10 + 0.15 \times 20 + 0.1 \times 50 = 13$	14p	4	M2 for $0.5 \times 5 + 0.25 \times 10 + 0.15 \times 20 + 0.1 \times 50$ oe or for a consistent calculation for n spins, e.g. $50 \times 5 + 25 \times 10 + 15 \times 20 + 10 \times 50$ where n = 100 (condone one error) (M1 for 0.5×5 or 0.25×10 or 0.15×20 or 0.1×50 oe) A1 for 13 or 14 A1 for 14p
Total for Question: 4 marks				
13.	$\frac{5}{9} \times \frac{4}{8} + \frac{4}{9} \times \frac{5}{8} = \frac{20}{72} + \frac{20}{72}$ <p>OR</p> $1 - \left[\frac{5}{9} \times \frac{4}{8} + \frac{4}{9} \times \frac{3}{8} \right]$ $= 1 - \frac{32}{72}$	$\frac{40}{72}$	4	M1 for tree diagram with at most 2 errors or one of $\frac{5}{9} \times \frac{4}{8}$ or $\frac{4}{9} \times \frac{5}{8}$ or $\frac{4}{9} \times \frac{3}{8}$ or $\frac{20}{72}$ or $\frac{12}{72}$ or $\frac{5}{18}$ oe M1 for any two of $\frac{5}{9} \times \frac{4}{8}$, $\frac{4}{9} \times \frac{5}{8}$, $\frac{4}{9} \times \frac{3}{8}$ or $\frac{20}{72}$, $\frac{12}{72}$ or $\frac{5}{18}$, $\frac{5}{18}$, $\frac{3}{18}$ oe M1 for $\frac{5}{9} \times \frac{4}{8} + \frac{4}{9} \times \frac{5}{8}$ oe or $1 - \left[\frac{5}{9} \times \frac{4}{8} + \frac{4}{9} \times \frac{3}{8} \right]$ oe A1 for $\frac{40}{72}$ oe SC B2 for $\frac{40}{81}$
Total for Question: 4 marks				
14. QWC (ii, iii)	$\frac{4}{50} = \frac{50}{N}$ $(4 \times 12.5) / (50 \times 12.5) = 50/625$	625	4	M1 for $\frac{4}{50}$ oe or $\frac{50}{N}$ or 12.5 seen M1 for $(4 \times 12.5) / (50 \times 12.5)$ or an attempt to scale, i.e. $4 \times k / 50 \times k$ A1 for 625 C1 for a correct assumption, e.g. the population has not changed over night or the dye has not washed off or the returned sample has thoroughly mixed with the population or the sample is random, etc QWC: Assumption must be stated clearly, in line with supporting calculations
Total for Question: 4 marks				

November 2009

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